

**THE HARVESTMAN FAMILY PHALANGODIDAE. 2.  
THE NEW GENUS, *MICROCINA*  
(OPILIONES, LANIATORES)**

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ABSTRACT

A new phalangodid genus, *Microcina*, is described to accommodate *Sitalcina tiburona* Briggs and Hom and five new species (*edgwoodensis*, *homi*, *jungi*, *leei*, and *lumi*). The species are diagnosed and illustrated and their relationships hypothesized.

The six species of *Microcina*, known only from the San Francisco Bay region, are all pedomorphs restricted to xeric habitats. Two species groups are present: the first (*tiburona*) is characterized by a unique form of sexual dimorphism (males have enlarged eye tubercles); the second (*homi*) by unique male genitalia, structurally intermediate between *Calicina* and the remaining Nearctic phalangodid genera.

INTRODUCTION

The phalangodid genus *Sitalcina*, established by Banks (1911) for *Sitalces californicus* Banks, was revised and greatly enlarged by Briggs (1968). In our recent study (Ubick and Briggs 1989), *Sitalcina* was shown to be polyphyletic and most of the species were transferred to a newly established genus, *Calicina*. At that time three species remained unplaced. One of these species, *Sitalcina tiburona* Briggs and Hom, represents yet another new genus, *Microcina*, the focus of this paper.

This study is based on the examination of 140 specimens, almost all from the collection of TSB and now deposited in the California Academy of Sciences; additional material was borrowed from and is deposited at the American Museum of Natural History (New York). The specimens were collected by the authors and the following persons: Lee Cheng, C. Fox, A. Gray, Kevin Hom, Albert Jung, Jason Lee, Vincent F. Lee, Bill Lum, Toshiro Ohsumi, and Ken Wang. The specimens were prepared and examined as in Ubick and Briggs (1989). The species descriptions are brief, partly because character states shared at higher levels (genus and species group) are not repeated. More important is the apparent absence of significant intraspecific variation in *Microcina* for the characters examined. Some variation in size has been recorded and is given in Table 1. There is also little interspecific variation between the members of the *tiburona* group and no characters have been found to reliably distinguish the females. All specimen measurements are in mm.

Table 1.—Measurements (in mm) of *Microcina* species giving ranges, means, and standard deviations. Abbreviations are TBL = total body length, SL = scute length, SW = scute width, LIIL = leg II length, ETL = eye tubercle length, ETW = eye tubercle width.

Species	Sex	N	TBL	SL	SW	LIIL	ETL	ETW
<i>homi</i>	m	13	0.82-1.00	0.55-0.72	0.58-0.69	1.40-1.90	0.13-0.18	0.12-0.18
			0.888±0.053	0.625±0.044	0.626±0.035	1.594±0.132	0.145±0.013	0.139±0.016
	f	19	0.79-1.05	0.55-0.74	0.56-0.78	1.51-1.92	0.12-0.18	0.13-0.18
<i>tiburona</i>	m	17	0.904±0.075	0.640±0.049	0.661±0.067	1.651±0.133	0.145±0.015	0.150±0.015
			0.97-1.21	0.76-0.87	0.69-0.85	1.90-2.44	0.22-0.28	0.24-0.33
	f	13	0.97-1.22	0.67-0.80	0.71-0.85	1.82-2.18	0.18-0.21	0.18-0.23
<i>leei</i>	m	3	1.074±0.062	0.765±0.035	0.779±0.041	1.984±0.133	0.187±0.012	0.211±0.013
			0.87-1.10	0.64-0.70	0.59-0.67	1.74-1.85	0.18-0.19	0.21-0.23
	f	3	0.973±0.117	0.677±0.032	0.637±0.042	1.797±0.055	0.183±0.006	0.217±0.012
<i>lumi</i>	m	5	0.80-0.97	0.63-0.69	0.57-0.69	1.60-1.70	0.12-0.15	0.15-0.18
			0.863±0.093	0.650±0.035	0.620±0.062	1.663±0.055	0.140±0.017	0.167±0.015
	f	4	0.97-1.10	0.72-0.79	0.68-0.72	1.69-1.87	0.18-0.26	0.23-0.28
<i>jungi</i>	m	4	1.040±0.054	0.760±0.029	0.712±0.018	1.804±0.074	0.224±0.029	0.250±0.021
			0.95-1.18	0.64-0.72	0.68-0.77	1.77-1.87	0.13-0.15	0.15-0.18
	f	2	1.070±0.112	0.675±0.037	0.720±0.042	1.815±0.042	0.145±0.012	0.170±0.014
<i>edge-woodensis</i>	m	3	1.05-1.20	0.77-0.88	0.73-0.83	1.97-2.13	0.21-0.26	0.26-0.31
			1.107±0.065	0.847±0.052	0.785±0.042	2.082±0.076	0.232±0.021	0.280±0.022
	f	2	0.97-1.10	0.75-0.77	0.78-0.80	1.93-2.00	0.17-0.18	0.18-0.19
<i>edge-woodensis</i>	m	3	1.035±0.092	0.760±0.014	0.790±0.014	1.965±0.050	0.175±0.007	0.185±0.007
			0.90-0.97	0.67-0.70	0.62-0.70	1.50-1.87	0.18-0.21	0.22-0.26
			0.940±0.036	0.683±0.015	0.650±0.043	1.733±0.203	0.193±0.015	0.247±0.023

### *Microcina*, new genus

*Sitalcina*: Briggs and Hom 1966. Briggs 1968 (in part).

**Diagnosis.**—Species of *Microcina* appear to be unique among the Nearctic Phalangodidae in having an areolate body cuticle (Fig. 1). They are further distinguished from other phalangodids with reduced tarsal counts (3-4-4-4) in having a penis with a folding glans and an ovipositor cuticle completely covered with microspines.

**Type species.**—*Sitalcina tiburona* Briggs and Hom, 1966.

**Etymology.**—The generic name is a contraction of micro and *Sitalcina*, referring to the small size of the species, and is feminine in gender.

**Description.**—Color of body pale orange; appendages yellowish white. Abdominal integument (of preserved specimens) somewhat transparent; irregular white masses visible beneath cuticle. Body length 0.8 to 1.2 mm. Carapace cuticle with honeycomb network of ridges (areolate); flattened tubercles present in cephalic region. Tergites with posterior margins tuberculate (*homi* group) or smooth (*tiburona* group). Eye tubercle low and rounded (enlarged in males of the *tiburona* group); cornea and retina absent. Anterior margin of carapace with 1 pair of anterior tubercles; ozopores lateral. Venter similarly sculptured as dorsum. Palp with typical number and arrangement of megaspines: tarsus and tibia with two pairs each, patella with one (mesal), and femur with one mesoapical and three ectobasal. Tarsal count 3-4-4-4. Ovipositor surface with prominent ridges; completely covered with microspines; with 7 pairs of apical setae; setae apically hooked. Penis with folding glans, which also telescopes in the *homi* group. Stylus curved, spinelike; basally surrounded by a pair of lobes. Ventral plate rounded

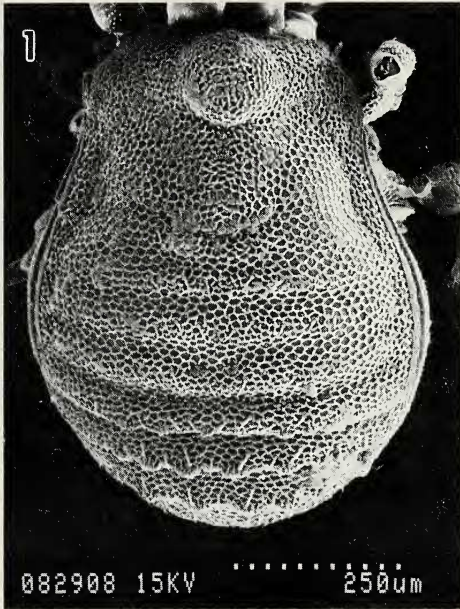


Figure 1.—*Microcina homi*, male topotype, dorsal view.

apically, with 1 pair of stout, lateral setae and 3-4 pairs of smaller, ventral setae; *homi* group with additional 2 pairs of lateral setae.

**Natural history.**—All species are winter active paedomorphs known only from xeric habitats.

**Distribution.**—The San Francisco Bay region of California.

**Species.**—The six species, representing two species groups, can be separated by the following key. No characters were found to distinguish females of the *tiburona* group.

KEY TO SPECIES OF *MICROCINA*

- 1. Male eye tubercle subequal to that of female. Penis stylus telescopes during expansion (Figs. 16-18); oviposter setae with simple tips (Fig. 10) (*homi* group) ..... *homi*  
 Male eye tubercle distinctly larger than that of female (Figs. 2-5). Stylus does not telescope during expansion (Figs. 21-33); ovipositor setae with trifurcate tips (Figs. 12, 13) ..... (*tiburona* group) ..2
- 2. Penis apical lobes pointed, stylus slightly sinuous (Figs. 24, 32). .....3  
 Apical lobes rounded, stylus strongly sinuous (Figs. 22, 26, 30). .....4
- 3. Apical lobes narrow, surface lightly fringed (Fig. 32). ..... *edgewoodensis*  
 Apical lobes wide, surface strongly fringed (Fig. 24). ..... *lei*
- 4. Penis substylar knob rounded (Fig. 26). ..... *lumi*  
 Substylar knob angular (Figs. 22, 30). .....5
- 5. Apical lobes with serrate ventral margin (Fig. 22) ..... *tiburona*  
 Apical lobes with smooth ventral margin (Fig. 30). ..... *jungi*



The *homi* species group

**Diagnosis.**—The single species representing this group, unlike other *Microcina*, has tubercles on the posterior tergite margins (Fig. 1). Males are unique among the Nearctic Phalangodidae in having a glans which both unfolds and telescopes during expansion (Figs. 14, 15, 18). Males are also distinguished from other *Microcina* in lacking enlarged eye tubercles (Fig. 1), in having the ventral plate with both ventral and lateral setal series (Fig. 17), in having a glans with apical lobes bearing stout fringe flaps (Fig. 7), and in lacking a substylar knob and dorsal flap on the glans (Figs. 6). Females have ovipositor setae with simple tips (Fig. 10).

**Distribution.**—Known only from Santa Clara County (Fig. 34).

*Microcina homi*, new species

Figs. 1, 6, 7, 10, 11, 14-20, 34.

*Sitalcina minor* Briggs and Hom, 1966:263 (in part, all individuals from Santa Clara County).

**Diagnosis.**—Same as for species group.

**Etymology.**—Named after Kevin Hom, collector of these and numerous other rare and unusual phalangodids.

**Description.**—*Male (Holotype)*: Total body length, 0.85. Scute length, 0.55; width, 0.61. Eye tubercle length, 0.14; width, 0.12. Leg II length, 1.40. Penis as illustrated (Figs. 6, 7, 14-20).

*Female*: Total body length, 0.88. Scute length, 0.60; width, 0.62. Eye tubercle length, 0.12; width, 0.13. Leg II length, 1.60. Ovipositor as illustrated (Figs. 10, 11).

**Natural history.**—Known only from grassland habitats. Specimens from Santa Teresa Park were collected beneath Franciscan sandstone; all others are from serpentine. This species is fully sympatric with *Calicina serpentina* (Briggs and Hom) and at one locality (0.9 mi. S Junction of Silver Creek and San Felipe Roads) with *Microcina jungi*, new species.

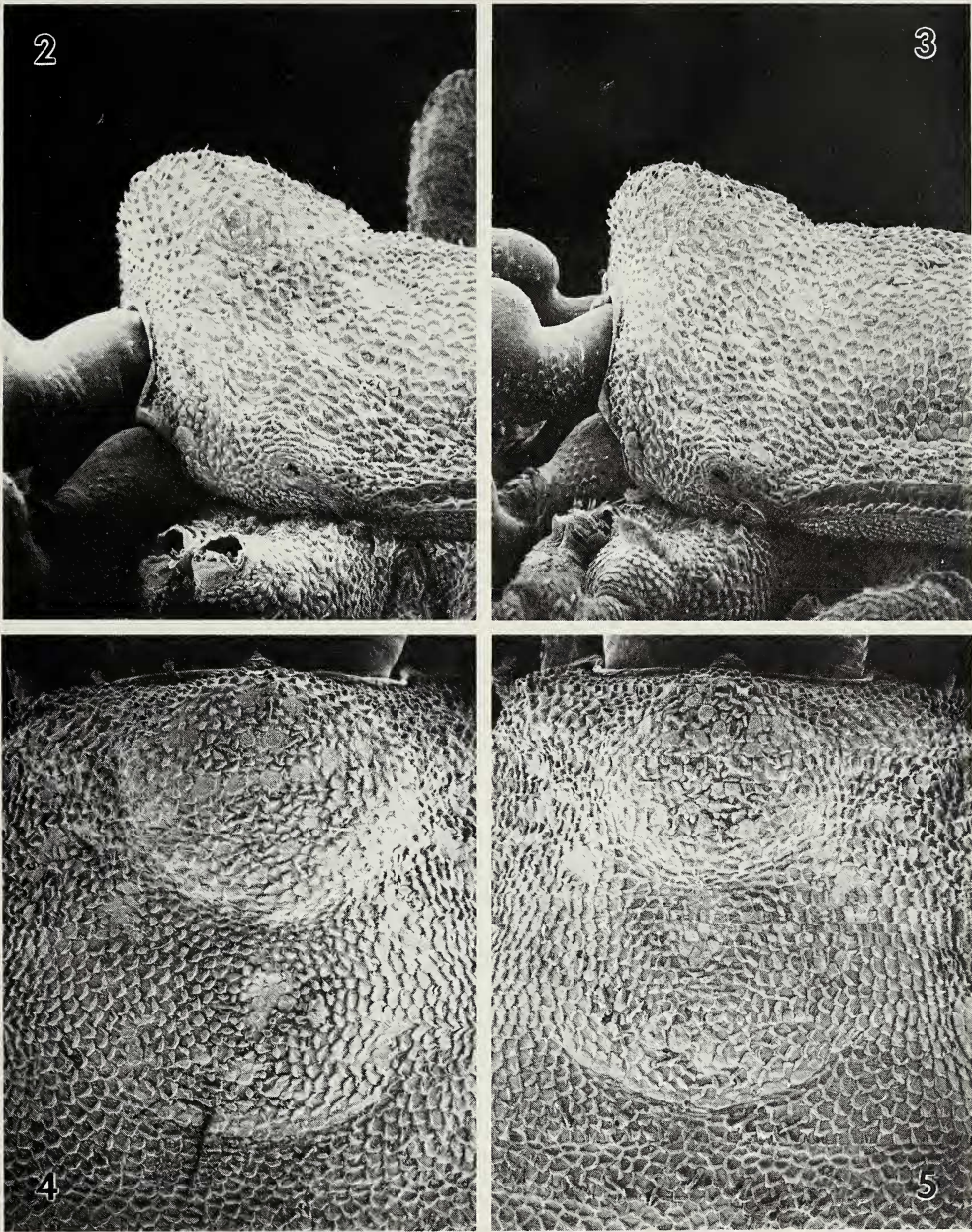
**Material examined.**—*Holotype*: U.S.A.: CALIFORNIA: *Santa Clara Co.*, 1.8 miles N of Highway 101 on Metcalf Road, 2 January 1983 (T. S. Briggs, V. F. Lee, and D. Ubick), male (CAS).

*Paratypes*: U.S.A.: CALIFORNIA; *Santa Clara Co.*, same data as holotype, 25 males, 20 females (CAS); 1 mile NW of Morgan Hill, 26 February 1966 (T. S. Briggs and K. Hom), male (CAS); 0.5 miles NW of Santa Teresa County Park, 27 February 1966 (T. S. Briggs), 2 females (CAS); 0.9 miles S of Junction of Silver Creek and San Felipe Roads, 27 November 1966 (T. S. Briggs and A. Jung), male, 3 females (CAS); San Jose, Silver Creek Road, 5 miles SE of Tully Road, 27 February 1966 (T. S. Briggs and K. Hom), 2 males, 12 females (CAS); San Jose, W side Silver Creek Road, 5 mi SW Tully Road, 27 November 1966 (T. S. Briggs and C. Fox), 7 males, 3 females (AMNH).

The *tiburona* species group

**Diagnosis.**—Members of this group have the posterior tergite margins smooth, lacking tubercles. Males differ from *homi* in having enlarged eye tubercles (Figs. 2-5) and non-telescoping styli (Figs. 8, 9, 21-33). Males may be further differentiated in having the ventral plate with only one pair of lateral setae (Figs. 21, 23, 25, 29, 31), in having a glans with apical lobes bearing a fine fringe (Figs.





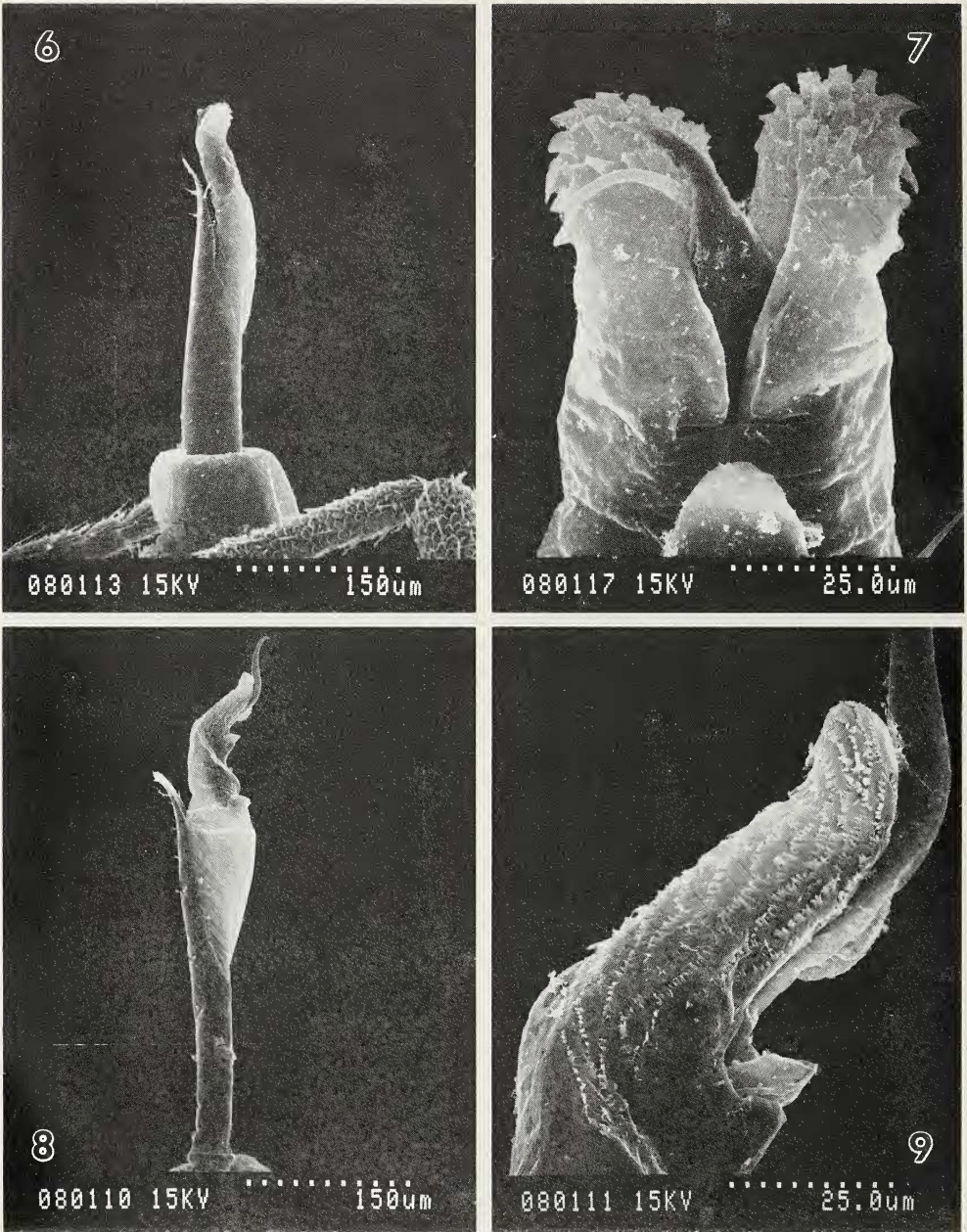
Figures 2-5.—*Microcina tiburona*, topotypes, cephalic region: 2, male, lateral view; 3, female, lateral view; 4, male, dorsal view; 5, female, lateral view. Scale bar = 0.30 mm.

22, 24, 26, 30, 32), and in having a substylar knob and a dorsal flap on the glans (Fig. 8, 9). Females have ovipositor setae with trifurcate tips (Figs. 12, 13).

**Distribution.**—Known only from the San Francisco Bay region (Fig. 34).

**Species.**—The five species representing this group can be distinguished by the male genital characters. We have not been able to discover characters for differentiating females.





Figures 6-9.—Male genitalia of *Microcina* species, topotypes: 6, 7, *M. homi*; 6, penis, lateral view; 7, glans, ventral view; 8, 9, *M. tiburona*; 8, penis, lateral view; 9, glans, lateral view.

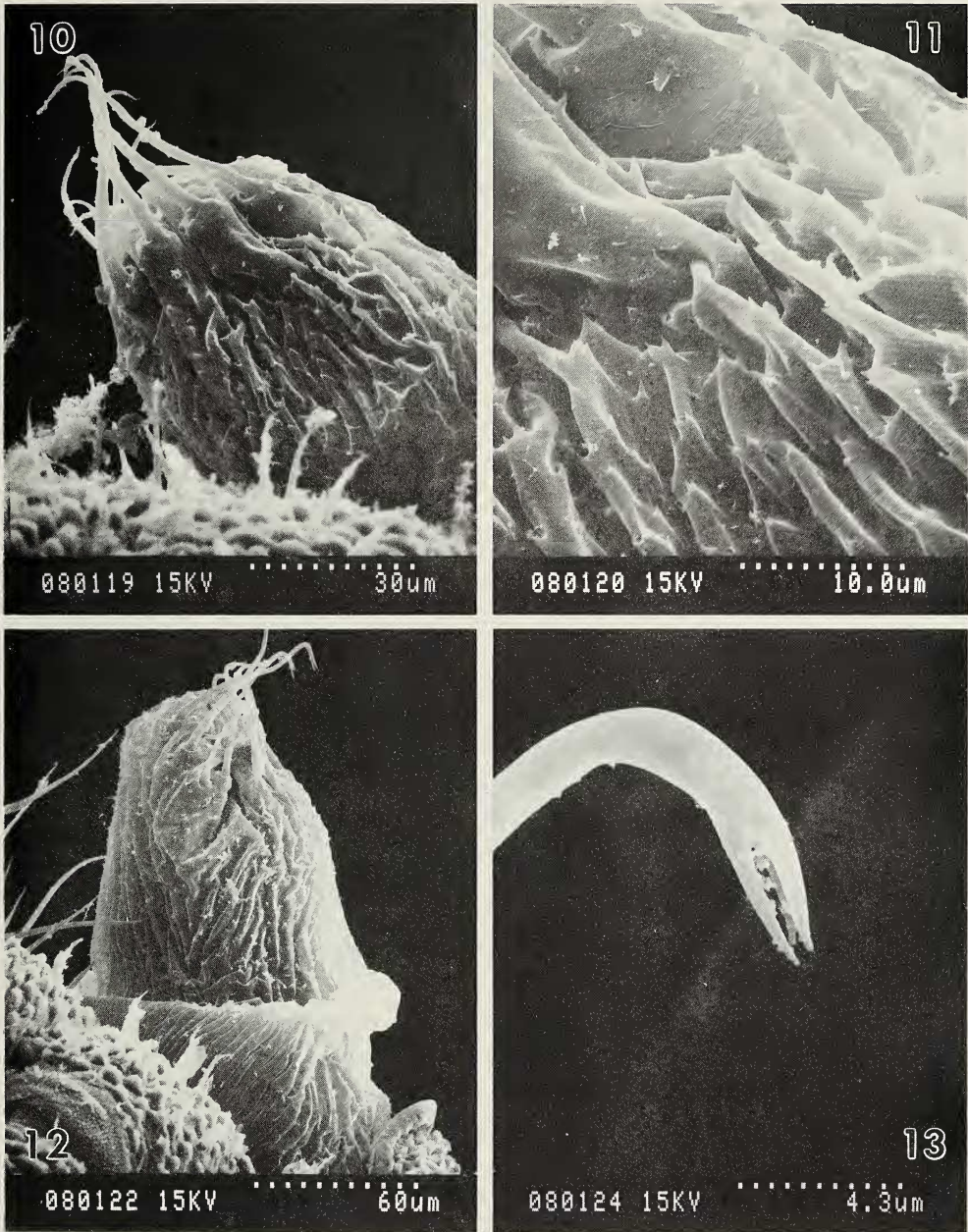
*Microcina tiburona* (Briggs and Hom), new combination

Figs. 2-5, 8, 9, 12, 13, 21, 22, 34

*Sitalcina tiburona* Briggs and Hom, 1966:265, Pl. 1 (figs. 2, 6). Briggs, 1968:27, (figs. 28, 58, 89).

**Diagnosis.**—This species is distinguished from others in the group by the following combination of male genitalic characters: stylus strongly sinuous; apical



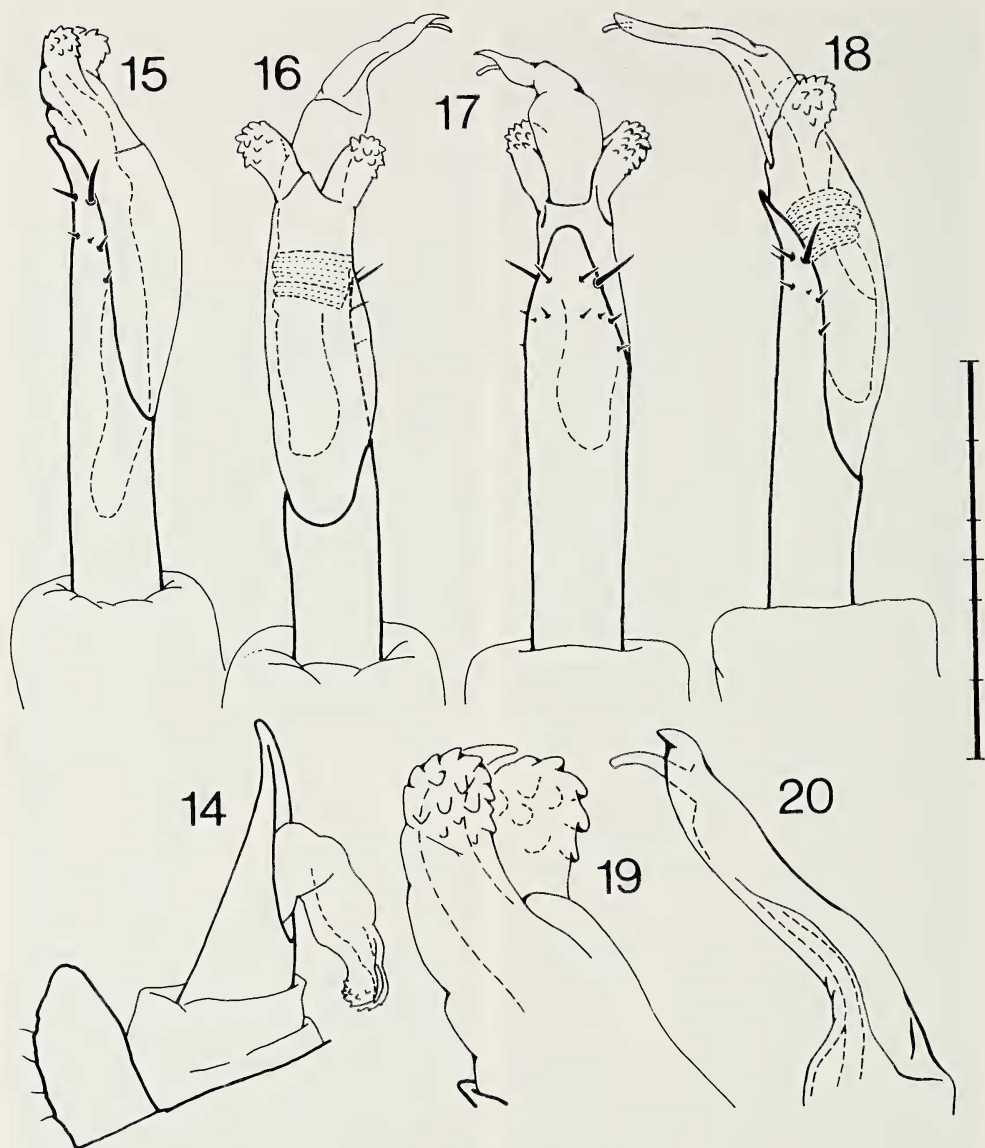


Figures 10-13.—Female genitalia of *Microcina* species, topotypes: 10, 11, *M. homi*; 10, ovipositor, lateral view; 11, ovipositor surface; 12, 13, *M. tiburona*; 12, ovipositor, lateral view; 13, ovipositor, apical seta.

lobes rounded with serrate ventral margin; and substylar knob angular (Figs. 8, 9, 21, 22).

**Description.**—*Male (Allotype)*: Total body length, 1.10. Scute length, 0.80; width, 0.75. Eye tubercle length, 0.24; width, 0.28. Leg II length, 1.90. Penis as illustrated (Figs. 8, 9, 21, 22).





Figures 14-20.—*Microcina homi*, male holotype (Figs. 16-18, 20), male paratopotype (Figs. 15, 19), male paratype, Silver Creek Road (Fig. 14): 14, unexpanded penis, lateral view; 15, partially expanded penis, lateral view; 16, fully expanded penis, dorsal view; 17, fully expanded penis, ventral view; 18, fully expanded penis, lateral view; 19, partially expanded glans, lateral view; 20, fully expanded stylus, lateral view. Scale = 0.25 mm (Figs. 14-18), 0.10 mm (Figs. 19, 20).

*Female (Holotype)*: Total body length, 1.10. Scute length, 0.80; width, 0.75. Eye tubercle length, 0.20; width, 0.22. Leg II length, 2.00 Ovipositor as illustrated (Figs. 12, 13).

**Natural history.**—All collections are from serpentine grassland. "*Sitalcina*" *cockerelli* Goodnight and Goodnight occurs in adjacent chaparral-grassland ecotone.

**Material examined.**—*Holotype*: U.S.A.: CALIFORNIA; *Marin Co.*, Tiburon, Ring Mountain, spring about 0.5 miles NE of Bel Aire School, 15 January 1966 (T. S. Briggs and K. Hom), female (CAS).

*Paratypes*: U.S.A.: CALIFORNIA; *Marin Co.*, same data as holotype, male (allotype), 4 males (CAS); 7 males, 3 females (AMNH), 22 January 1966 (T. S. Briggs and K. Hom), 5 males, 4 females (CAS); Tiburon, 0.5 miles S of El Campo, 22 January 1966 (K. Hom), 3 females (CAS).

*Other material*: U.S.A.: CALIFORNIA; *Marin Co.*, Tiburon, Ring Mountain, 19 December 1968 (T. S. Briggs), 2 males, 4 females (CAS); Tiburon, Ring Mountain, near stream between Reed Ranch Road and Ring Mountain Reserve boundary, 27 January 1985 (T. S. Briggs and K. Wang), male (CAS); 14 November 1987 (T. S. Briggs and J. Lee), 4 males, 2 females (CAS); Tiburon, end of Miraflores Lane off Avenida Miraflores, 21 December 1988 (T. S. Briggs and L. Cheng), 2 males, 2 females (CAS).

*Microcina leei*, new species

Figs. 23, 24, 34

**Diagnosis.**—This species is distinguished from others in the group by the following combination of male genital characters: stylus slightly sinuous, apical lobes pointed, and substylar knob indistinct.

**Etymology.**—Named after Vincent F. Lee, collector of this and many other phalangodids.

**Description.**—*Male (Holotype)*: Total body length, 1.10. Scute length, 0.70; width, 0.65. Eye tubercle length, 0.19; width, 0.21. Leg II length, 1.80. Penis as illustrated (Figs. 23, 24).

*Female*: Total body length, 0.82. Scute length, 0.63; width, 0.60. Eye tubercle length, 0.12; width, 0.17. Leg II length, 1.60. Ovipositor as in *M. tiburona*.

**Natural history.**—Found beneath sandstone rocks in open oak grassland where it is sympatric with *Calicina polina* (Briggs). Another phalangodid, *Sitalcina californica* (Banks), has been collected in adjacent, thickly forested areas.

**Material examined.**—*Holotype*: U.S.A.: CALIFORNIA; *Alameda Co.*, Berkeley, Woolsey Canyon (E of LeConte Street), N side of canyon adjacent to Lawrence Berkeley Laboratory Parking Lot, 21 December 1983 (T. S. Briggs, V. F. Lee, and D. Ubick), male (CAS).

*Paratypes*: U.S.A.: CALIFORNIA; *Alameda Co.*, Berkeley, N side of Woolsey Canyon, 17 February 1960 (A. Gray), male, female (AMNH); Oakland, 0.7 miles NE of Ashby on Claremont Avenue, 29 January 1983 (T. S. Briggs), male, female (CAS).

*Microcina lumi*, new species

Figs. 25-28, 34

**Diagnosis.**—This species is distinguished from others in the group by the following combination of male genital characters: stylus strongly sinuous, apical lobes rounded, and substylar knob rounded.

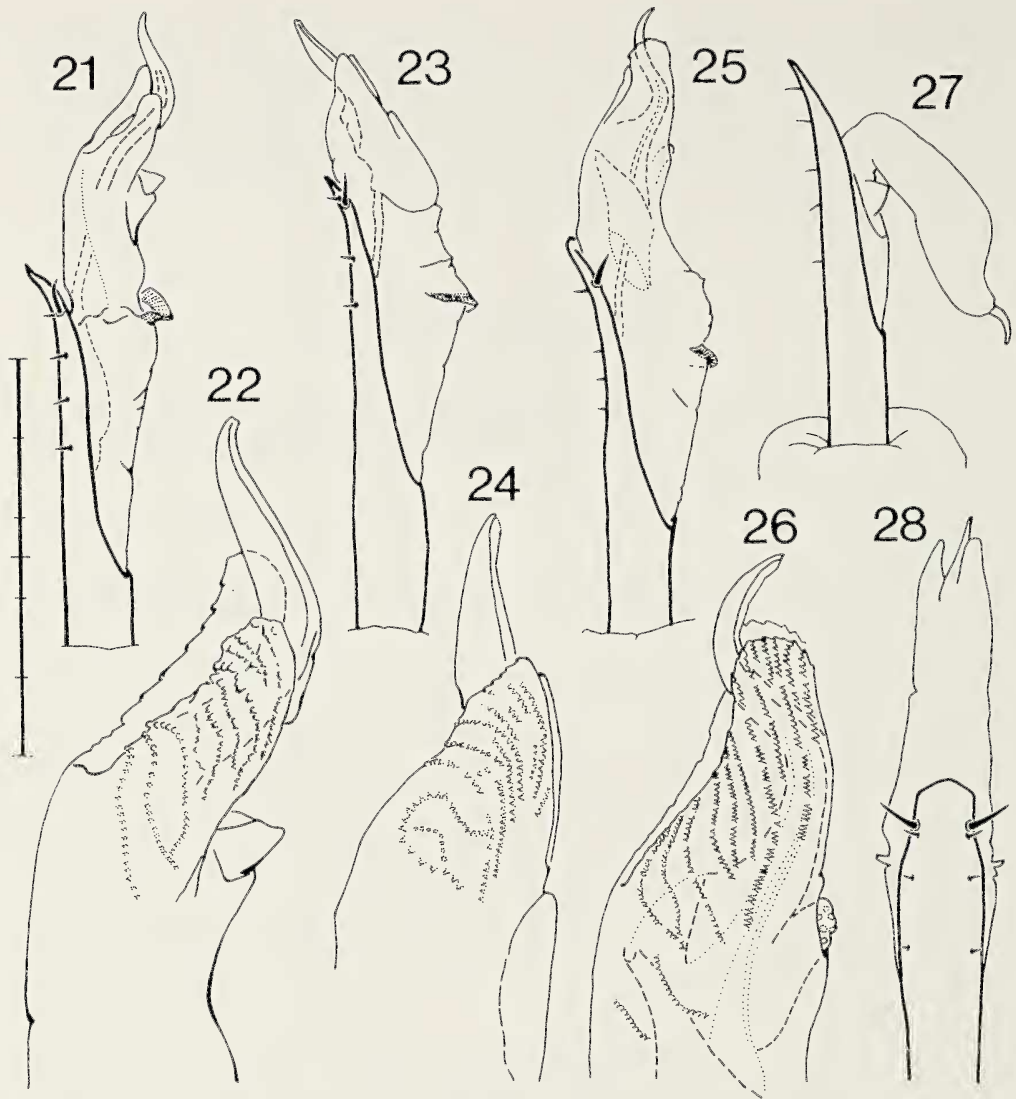
**Etymology.**—Named after Bill Lum, one of the collectors of this species.

**Description.**—*Male (Holotype)*: Total body length, 1.10. Scute length, 0.78; width, 0.68. Eye tubercle length, 0.22; width, 0.25. Leg II length, 1.80. Penis as illustrated (Figs. 25-28).

*Female*: Total body length, 1.00. Scute length, 0.65; width, 0.68. Eye tubercle length, 0.13; width, 0.15. Leg II length, 1.80. Ovipositor as in *M. tiburona*.

**Natural history.**—Found beneath serpentine rocks in grassland biomes; sympatric with *Calicina polina* (Briggs).

**Material examined.**—*Holotype*: U.S.A.: CALIFORNIA; *Alameda Co.*, 500 feet S of intersection of Lake Chabot Road and Fairmont Drive on W facing slope (400 feet elev.), 6 April 1982 (T. S. Briggs and D. Ubick), male (CAS).



Figures 21-28.—Male genitalia of *Microcina* species: 21, 22, *M. tiburona*, topotype; 21, expanded penis, lateral view; 22, glans, lateral view; 23, 24, *M. leei*, holotype; 23, expanded penis, lateral view; 24, glans, lateral view; 25-28, *M. lumi*, holotype; 25, expanded penis, lateral view; 26, glans, lateral view; 27, unexpanded penis, lateral view; 28, expanded penis, ventral view. Scale bar = 0.25 mm (Figs. 21, 23, 25, 27, 28), 0.10 mm (Figs. 22, 24, 26).

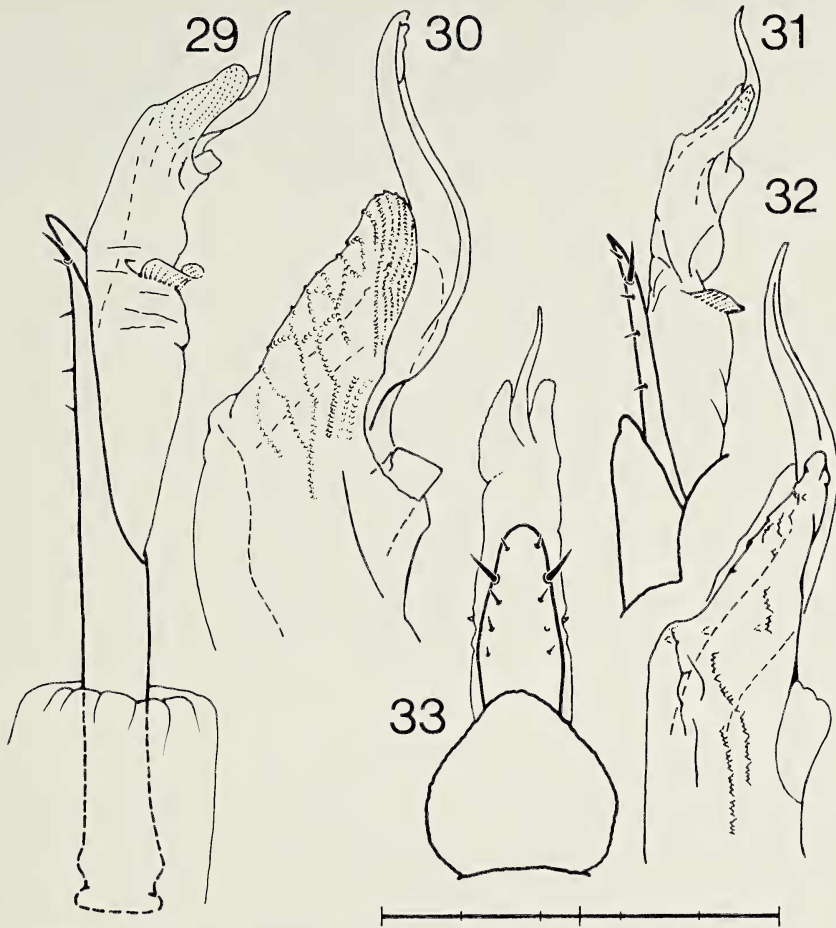
*Paratypes*: U.S.A.: CALIFORNIA; Alameda Co., same data as holotype, 3 females (CAS); NE San Leandro, near abandoned military road N of Fairmont Drive, 26 January 1969 (T. S. Briggs and B. Lum), 3 males, female (CAS).

*Microcina jungi*, new species

Figs. 29, 30, 34.

**Diagnosis.**—This species is distinguished from others in the group by the following combination of male genital characters: stylus strongly sinuous, apical lobes rounded with smooth ventral margin, and substylar knob angular.





Figures 29-33.—Male genitalia of *Microcina* species, holotypes: 29, 30, *M. jungi*; 29, expanded penis, lateral view; 30, glans, lateral view; 31-33, *M. edgewoodensis*; 31, expanded penis, lateral view; 32, glans, lateral view; 33, expanded penis, ventral view. Scale bar = 0.25 mm (Figs. 29, 31, 33), 0.10 mm (Figs. 30, 32).

**Etymology.**—Named after Albert K. S. Jung, collector of this and many other phalangodids.

**Description.**—*Male (Holotype)*: Total body length, 1.20. Scute length, 0.88; width, 0.78. Eye tubercle length, 0.26; width, 0.31. Leg II length, 2.10. Penis as illustrated (Figs. 29, 30).

*Female*: Total body length, 1.10. Scute length, 0.75; width, 0.78. Eye tubercle length, 0.18; width, 0.19. Leg II length, 2.00. Ovipositor as in *M. tiburona*.

**Natural history.**—Found beneath serpentine rocks in grassland biomes; sympatric with *M. homi*, new species, and probably *Calicina serpentina* (Briggs and Hom).

**Material examined.**—*Holotype*: U.S.A.: CALIFORNIA; *Santa Clara Co.*, 0.9 miles S of junction of Silver Creek and San Felipe Roads, 27 November 1966 (T. S. Briggs and A. K. S. Jung), male (CAS).

*Paratypes*: U.S.A.: CALIFORNIA; *Santa Clara Co.*, same locality as holotype, male, 4 females (CAS).

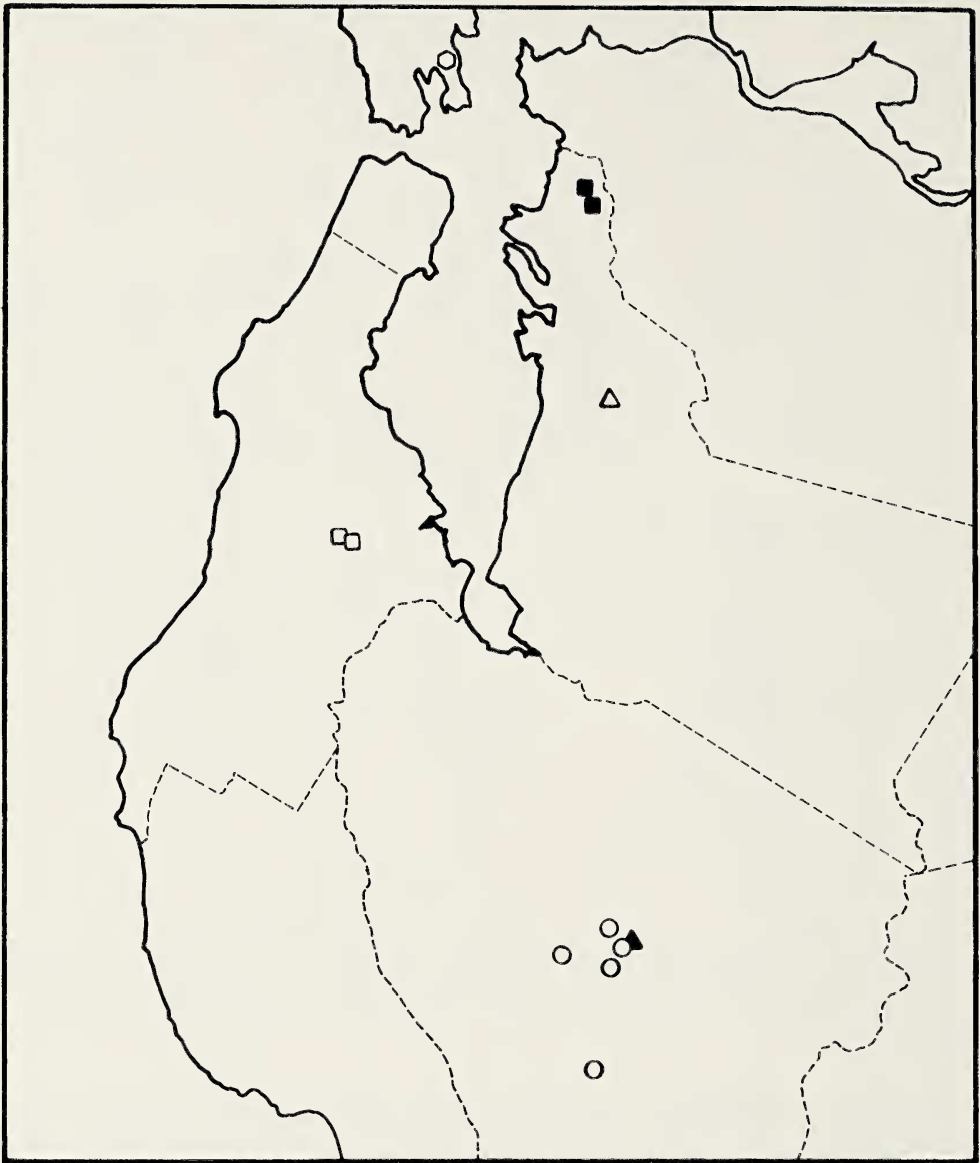


Figure 34.—Map of the San Francisco Bay Region, California, showing the distribution of *Microcina* species. *M. homi* (circles), *M. tiburona* (hexagon), *M. lumi* (open triangle), *M. jungi* (filled triangle), *M. edgewoodensis* (open squares), *M. lei* (filled squares).

*Microcina edgewoodensis*, new species

Figs. 31-34

**Diagnosis.**—This species is distinguished from others in the group by the following combination of male genital characters: stylus slightly sinuous; apical lobes strongly pointed, apically serrate; and substylar knob rounded.

**Etymology.**—Named after the type locality, Edgewood Park.

**Description.**—*Male (Holotype)*: Total body length, 0.95. Scute length, 0.68; width, 0.62. Eye tubercle length, 0.19; width, 0.22. Leg II length, 1.50. Penis as illustrated (Figs. 31-33).

*Female*: Unknown.

**Natural history.**—Found beneath serpentine rocks in grassland adjacent to scrub oaks; sympatric with *Calicina minor* (Briggs and Hom).

**Material examined.**—*Holotype*: U.S.A.: CALIFORNIA; *San Mateo Co.*, Edgewood Park, Canada and Edgewood Roads, 13 April 1985 (T. S. Briggs and T. Ohsumi), male (CAS).

*Paratypes*: U.S.A.: CALIFORNIA; *San Mateo Co.*, Edgewood Park, canyon between Sylvan and Serpentine Trails, 2 January 1987 (T. S. Briggs, V. F. Lee, and D. Ubick), 2 males (CAS).

## ECOLOGY

All species of *Microcina* live in open grassland biomes and are conspicuously modified for life in xeric environments. The species are small and lightly pigmented, lack eyes, and have (relative to other phalangodids) a reduced tarsal count (3-4-4-4) and a reduced number of anterior tubercles (1 pair). Such modifications, found in only one other Nearctic phalangodid genus, *Calicina*, appear to result from two phenomena: paedomorphosis (probably progenesis) and troglobism (Ubick and Briggs 1989).

With the exception of *M. tiburona*, all species of *Microcina* have been collected with (and apparently share the habitats of) the sympatric species of *Calicina*: *M. leei* and *M. lumi* with *C. polina* (Briggs); *M. jungi* and *M. homi* with *C. serpentina* (Briggs and Hom); and *M. edgewoodensis* with *C. minor* (Briggs and Hom).

## PHYLOGENY

**Monophyly.**—*Microcina* appears to be monophyletic on the basis of three possible synapomorphies. (1) Body cuticle sculpturing. The body cuticle of *Microcina* is areolate (Figs. 1-5), composed of an intricate honeycomb of ridges (similar to that found on the appendages of all phalangodids examined), whereas that of *Calicina* and *Sitalcina* is tuberculate. Superficial examination of the remaining phalangodids suggests that the areolate cuticle is unique to *Microcina*. Both on the basis of uniqueness and an apparently more orderly nature, the areolate cuticle appears to be derived. (2) Paedomorphic-troglobitic adaptations. The species of *Microcina* are all small and show reduction in structures (pigmentation, eyes, anterior tubercles, and tarsal count). These adaptations are absent in most phalangodids and may be synapomorphic for *Microcina*. However, the strength of this character is weakened since parallel paedomorphic-troglobitic modifications are found in species of *Calicina*. (3) Apical lobe ornamentation. The glans of *Microcina* has the apical lobes ornamented with a scale-like fringe; large in *M. homi* (Figs. 6, 7), small in the *tiburona* group (Figs. 8, 9). These structures have not been observed in species of *Calicina* or *Sitalcina*; it remains to be seen whether they are unique to *Microcina*.

**Species groups.**—*Microcina* contains two well defined species groups. The *tiburona* group, with five species, is characterized by a unique (at least among the North American and European phalangodids) sexual dimorphism (males have enlarged eye tubercles) and several male genitalic characters (see Diagnosis). The second group contains a single species, *M. homi*, which has an unusual glans, possibly unique, which both unfolds and telescopes during expansion.

**Sister group.**—The species of *Microcina* share with all other Nearctic Phalangodidae, except *Calicina*, a folding glans. Although the widespread



distribution of this state suggests plesiomorphy, we have argued previously (Ubick and Briggs 1989) that the folding glans is probably derived for two reasons: (1) the folding glans is structurally more complex than the telescoping glans and (2) the folding glans is usually associated with additional and clearly derived genitalic characters, such as the bifurcate ventral plate found in *Banksula*, *Texella*, and all Appalachian genera. The folding glans is thus presumed to be a synapomorphy.

Two possible symplesiomorphies join *Microcina* and *Calicina*: (1) The telescoping glans, shared by all species of *Calicina*, also occurs in *M. homi*. In this species the glans unfolds, as in all other *Microcina*, but subsequently telescopes for complete expansion (Figs. 16-18, 20). This type of glans appears to be unique; it is not known to occur in any other species of Nearctic Phalangodidae nor in the European species examined (*Ptychosoma vitellinum* Soerensen and *Scotolemon lespesi* Lucas). (2) Both *Microcina* and *Calicina* have ovipositors bearing microspines (Figs. 10-12), which appear to be absent in *Sitalcina*. The significance of this character will be elucidated as other genera are examined. However, the character state found in *Microcina* (microspines completely cover ovipositor) appears to be plesiomorphic in *Calicina* (because of correlation with presumably plesiomorphic male genitalic characters) and may likewise be so in *Microcina*.

## BIOGEOGRAPHY

*Microcina* is known only from the San Francisco Bay region (Fig. 34). The six species are allopatric; some are restricted to unusually small areas of suitable habitat. The single known instance of sympatry is between *M. homi* and *M. jungi*, which belong to different species groups. This suggests that the initial barrier which isolated the groups occurred in the southern part of the *Microcina* range. If dispersal did not play a significant role in the formation of the present distribution, then this barrier would have been located in what is now Santa Clara County.

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